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<tr><th colspan="3">APPEAL BRIEF</th></tr>
<tr><td>First Named Inventor:
Philip D. Nguyen</td><td colspan="2">Docket Number:
2003-IP-010380U1</td></tr>
<tr><td>Application Number:
10/691,319</td><td>Art Unit:
1715</td><td>Conf. Number:
5926</td></tr>
<tr><td>Filing Date:
October 22, 2003</td><td colspan="2">Examiner:
Elena Tsoy Lightfoot</td></tr>
<tr><td colspan="3">Title:
Methods for Reducing Particulate Density and Methods of Using Reduced-Density Particulates</td></tr>
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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir,

Pursuant to 37 C.F.R. § 41.37, please consider the following Appellant's Brief in the referenced application currently before the Board of Patent Appeals and Interferences. This brief is submitted in support of Appellant's Notice of Appeal dated October 21, 2010 from the rejections in the Final Office Action dated July 21, 2010 (the "Final Office Action"), the Advisory Action dated August 31, 2010 (the "Advisory Action"), and the Notice of Panel Decision from the Pre-Appeal Brief Review dated November 12, 2010.

Pursuant to the Notice of Panel Decision from Pre-Appeal Brief Review, the shortened statutory period for filing this Appeal Brief is one month from the mailing of that decision, or two months from the receipt of the Notice of Appeal, which was filed on October 21, 2010. The response is thus due on or before December 21, 2010; therefore, this Appeal Brief is timely.

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I. STATEMENT OF THE REAL PARTY IN INTEREST

The real party in interest in the referenced Application is:

Halliburton Energy Services, Inc.
10200 Bellaire Blvd.
Houston, Texas 77072

assignee of all rights and interests in the present application. An assignment to Halliburton of the this application was signed by the inventor and recorded with the United States Patent and Trademark Office at Reel/Frame 014637/0392 on October 22, 2003 and is effective under Manual of Patent Examining Procedure ("MPEP") 306.

II. RELATED APPEALS AND INTERFERENCES

To the best of the knowledge of the Appellant and the Appellant's legal representative, there are no other appeals or interferences that will directly affect, be affected by, or have a bearing on the decision of the Board of Patent Appeals and Interferences ("the Board") in this appeal.

III. STATUS OF CLAIMS

The present application, Serial No. 10/691,319 (hereinafter "the Application"), was filed October 22, 2003 and included claims 1–64, claims 65-77 were added during prosecution. Claims 1-17 were cancelled following a restriction requirement and claims 20-24, 27, 37-41, 44, 50-61, 63-64, and 67 are withdrawn as directed to a non-elected species. In addition, claims 30, 33, 34, 47, and 62 were cancelled during prosecution. Claims 18-19, 25-26, 28-29, 31-32, 35-36, 42-43, 45-46, 48-49, 65-66 and 68-77 are finally rejected and appealed. A listing of all appealed claims is provided in Appendix A of this Appeal Brief.

IV. STATUS OF AMENDMENTS

All amendments submitted to the Examiner during prosecution prior to the submission of this Appeal Brief have been entered in the record. The Claims provided in Appendix A hereto reflect claims 18-19, 25-26, 28-29, 31-32, 35-36, 42-43, 45-46, 48-49, 65-66 and 68-77 as they presently stand.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The application contains three independent claims, namely claims 18, 35, and 68, which are the subject of this appeal. Appellant proffers the following summary of the independent claims, identifying exemplary support in the as-filed specification. While examples of supporting disclosure are presented, it should be understood that additional examples and/or embodiments may also be disclosed within the specification and drawings as well.

With regard to aspects of the invention set forth in independent claim 18, discussion of the recited features of that claim can be found at least in the below cited locations of the specification. Claim 18 describes certain embodiments of the present invention that are directed to a method of treating a subterranean formation. (*See e.g.*, Spec p. 3, ll. 10-11). The method includes the step of providing a first flowing stream comprising at least one coated particulate, wherein the coated particulate comprises a particulate coated with a coating material and wherein the particulate has a size in the range of from 4 to 100 U.S. mesh. (*See e.g.*, Spec p. 5, ll. 8-18 and p. 13, ll. 6-23). And providing a second flowing stream comprising at least one density reducing material comprising polystyrene divinylbenzene. (*See e.g.*, Spec p. 11, ll. 30-31 and p. 13, ll. 6-23). Wherein the density reducing material is a solid material with a size that is greater

than about half the size of the coated particulate and has a specific gravity less than the coated particulate. (*See e.g.*, Spec p. 11, ll. 22-27). And combining the first flowing stream and the second flowing stream to form a third flowing stream that comprises the first flowing stream, and the second flowing stream, wherein the first flowing stream and the second flowing stream are combined and mixed while continuing to flow as a stream. (*See e.g.*, Spec p. 13, ll. 6-23). And allowing the density reducing material to adhere to a surface of the coated particulate to create at least one reduced-density, coated particulate in the third flowing stream. (*See e.g.*, Spec p. 12, ll. 12-22). And combining the reduced-density, coated particulate with a servicing fluid to form a fourth flowing stream. (*See e.g.*, Spec p. 13, ll. 6-23). And placing the fourth flowing stream into the subterranean formation. (*See e.g.*, p. 13, ll. 6-23; *see also* p. 3, ll. 11-17).

With regard to aspects of the invention set forth in independent claim 35, discussion of the recited features of that claim can be found at least in the below cited locations of the specification. Claim 35 describes certain embodiments of the present invention that are directed to a method of treating a subterranean formation. (*See e.g.*, Spec p. 3, ll. 10-11). The method includes the step of providing a first flowing stream comprising at least one coated particulate, wherein the coated particulate comprises a particulate coated with a coating material and wherein the particulate has a size in the range of from 4 to 100 U.S. mesh. (*See e.g.*, Spec p. 8, ll. 8-18 and p. 13, ll. 6-23). And providing a second flowing stream comprising at least one density reducing material, wherein the density reducing material is a solid material with a size that is greater than about half the size of the coated particulate and has a specific gravity less than the coated particulate. (*See e.g.*, Spec p. 11, ll. 22-27). And combining the first flowing

stream and the second flowing stream to form a third flowing stream that comprises the first flowing stream, and the second flowing stream, wherein the first flowing stream and the second flowing stream are combined and mixed while continuing to flow as a stream. (*See e.g.*, Spec p. 13, ll. 6-23). And allowing the density reducing material to adhere to a surface of the coated particulate to create at least one reduced-density, coated particulate in the third flowing stream. (*See e.g.*, Spec p. 12, ll. 12-22). And combining the reduced-density, coated particulate with a fracturing fluid to form a fourth flowing stream. (*See e.g.*, Spec p. 13, ll. 6-23). And placing the fourth flowing stream into the subterranean formation at a pressure sufficient to create at least one fracture therein. (*See e.g.*, p. 13, ll. 6-23; *see also* p. 3, ll. 11-17; *see also* p. 20, ll. 1-11).

With regard to aspects of the invention set forth in independent claim 68, discussion of the recited features of that claim can be found at least in the below cited locations of the specification. Claim 68 describes certain embodiments of the present invention that are directed to a method of treating a subterranean formation. (*See e.g.*, Spec p. 3, ll. 10-11). The method includes the step of providing a first flowing stream comprising at least one coated particulate, wherein the coated particulate comprises a particulate coated with a coating material and wherein the particulate has a size in the range of from 4 to 100 U.S. mesh. (*See e.g.*, Spec p. 8, ll. 8-18 and p. 13, ll. 6-23). And providing a second flowing stream comprising at least one density reducing material, wherein the density reducing material is a solid material with a size that is greater than about half the size of the coated particulate and has a specific gravity less than the coated particulate. (*See e.g.*, Spec p. 11, ll. 22-27). And combining the first flowing stream and the second flowing stream to form a third flowing stream that comprises the

first flowing stream, and the second flowing stream, wherein the first flowing stream and the second flowing stream are combined and mixed while continuing to flow as a stream. (*See e.g.*, Spec p. 13, ll. 6-23). And allowing the density reducing material to adhere to a surface of the coated particulate to create at least one reduced-density, coated particulate in the third flowing stream. (*See e.g.*, Spec p. 12, ll. 12-22). And combining the reduced-density, coated particulate with a servicing fluid to form a fourth flowing stream. (*See e.g.*, Spec p. 13, ll. 6-23). And placing the fourth flowing stream into the subterranean formation. (*See e.g.*, p. 13, ll. 6-23; *see also* p. 3, ll. 11-17).

VI. GROUND OF REJECTION TO BE REVIEWED ON APPEAL

1. Whether claims 18-19, 25, 28, 31-32, 35-36, 42, 45, 48-49, 65-66, 68-73, 75, and 77 are unpatentable under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 5,381,864 to Nguyen *et al*. (hereinafter "*Nguyen*") in view of U.S. Patent No. 4,969,523 to Martin *et al*. (hereinafter "*Martin*"), further in view of U.S. Patent No. 4,493,875 to Beck *et al*. (hereinafter "*Beck*").

2. Whether claims 18-19, 25, 28, 31-32, 35-36, 42, 45, 48-49, 65-66, 68-73, 75, and 77 are unpatentable under 35 U.S.C. § 103(a) as obvious over *Nguyen* in view of *Martin* and *Beck*, and further in view of U.S. Patent No. 5,585,524 to Sielcken *et al*. (hereinafter "*Sielcken*").

3. Whether claims 18-19, 25-26, 28, 31-32, 35-36, 42-43, 45, 48-49, 65-66, 68-75, and 77 are unpatentable under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 5,128,390 to Murphey *et al*. (hereinafter "*Murphey '390*") in view of *Martin* and *Beck*, and further in view of *Sielcken*.

4. Whether claims 26, 43, and 74 are unpatentable under 35 U.S.C. § 103(a) as obvious over *Nguyen* in view of *Martin* and *Beck*, or over *Nguyen* in view of *Martin* and *Beck*, further in view of *Sielcken* or over *Murphey '390* in view of *Martin* and *Beck*, further in view of *Sielcken*, and further in view of U.S. Patent No. 4,665,988 to Murphey *et al.* (hereinafter "*Murphey '988*").

5. Whether claims 28-29, 45-46, and 75-76 are unpatentable under 35 U.S.C. § 103(a) as obvious over *Nguyen* in view of *Martin* and *Beck* or over *Nguyen* in view of *Martin* and *Beck*, further in view of *Sielcken* or over *Murphey '390*, in view of *Martin* and *Beck*, further in view of *Sielcken*, and further in view of U.S. Patent Application No. 2002/0048676 to McDaniel *et al.* (hereinafter "*McDaniel*").

VII. ARGUMENT

A. Rejection of Claims 18-19, 25, 28, 31-32, 35-36, 42, 45, 48-49, 65-66, 68-73, 75 and 77 under 35 U.S.C. § 103(a) over *Nguyen* in view of *Martin* and *Beck*

Claims 18-19, 25, 28, 31-32, 35-36, 42, 45, 48-49, 65-66, 68-73, 75 and 77 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,381,864 to Nguyen et al. (hereinafter "Nguyen") in view of U.S. Patent No. 4,969,523 to Martin et al. (hereinafter "Martin"), further in view of U.S. Patent No. 4,493,875 to Beck et al. (hereinafter "Beck"). Appellants respectfully disagree.

1. <u>*The Proposed Combination Renders the Prior Art Unsatisfactory for Its Intended Purpose*</u>

In order for a reference or combination of references to form the basis for a rejection under § 103(a), a prima facie case of obviousness must be established. Obviousness is determined by construing the scope of the prior art, identifying the differences between the claims and the prior art, determining the level of skill in the

pertinent art at the time of the invention, and considering objective evidence present in the application indicating obviousness or nonobviousness. (*Graham v. John Deere*, 383 U.S. 1, 17 (1966)). In forming a rejection based on a combination of prior art elements, the proposed modification cannot render the prior art invention being modified unsatisfactory for its intended purpose. As stated in MPEP § 2143.01, "[i]f the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion of motivation to make the proposed modification." (*In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984); MPEP § 2143.01). As a result, a rejection based on the combination of multiple references cannot establish a prima facie case of obviousness if two or more of the references cannot be combined.

In the present rejection, the Examiner states that "[i]t would have been obvious to one of ordinary skill in the art at the time the invention was made to have produced sand/SVDB particulate material that closely matches density of carrier liquids in Nguyen *et al.* '864 in view of *Martin* as composite particles having dense core particles coated with low density particles with the expectation of avoiding the settling problem, as taught by Beck et al." (Final Office Action at 7). Appellants disagree since the proposed combination of *Beck* with *Nguyen* and/or *Martin* would render the invention of *Nguyen* unsatisfactory for its intended purpose.

With respect to *Nguyen*, the invention is directed towards the use of a treating composition comprising a particulate <u>blend</u>. (*See Nguyen* Abstract). Specifically, *Nguyen* is directed towards addressing the need for "treating techniques wherein the particulate materials used will both (a) prevent the migration of formation sand and fines, and (b)

provide high relative production rates." (*Nguyen* at col. 4, ll. 41-44). The use in the prior art described in *Nguyen* of a single sized particulate involves a trade-off between using a large particulate and a small particulate. (*Id.* at col. 4, ll. 18-36). Large particulates provide high initial permeability but allow for the migration of formation fines into the proppant bed. (*Id.*). Small particulates prevent the migration of formation sand and fines but have relatively low permeabilities and therefore yield substantially reduced production rates. (*Id.*). The solution to using a single sized particulate as disclosed in *Nguyen* is the use of a particulate <u>blend</u> comprising a large particulate material and a small particulate material. (*Id.* at col. 7, ll. 29-37). The blend allows the individual particulates to form a pack in the formation that "provides a high permeability flow path to the wellbore and [] prevent[s] the migration of formation sand and fines through the formation fractures." (*Id.* at col. 13, ll. 18-34). Example 1 of *Nguyen* demonstrates the improved results obtained using a <u>blend</u> of particulates relative to samples of both relatively large particulates alone and relatively small particulates alone. (*Id.* at col. 18, l. 24 – col. 19, l. 11). Thus, the principle of operation of *Nguyen* clearly relies upon the inclusion of a <u>blend</u> of particulates, and the particulates of *Nguyen* would not be satisfactory for their intended purpose if only a single sized particulate were to be used.

The Examiner has also argued that *Nguyen* can be used with a hardenable resin system and that such a system forms a coated particulate. (Final Office Action at 5). Appellants agree that *Nguyen* discloses the use of a hardenable resin system in an embodiment, but disagree that such a system results in a coated particulate. The Examiner's main argument appears to be that a resin coated particulate would result in the adhesion of the various particles in the stream. (Final Office Action at 5-6). Further,

the Examiner argues that "Nguyen teaches nowhere that the large particulate material and a small particulate material should be present separately from each other in a stream in the presence of the hardenable (adhesive) resin . . . ." (Final Office Action at 5). Appellants respectfully disagree with this argument.

Nguyen does disclose throughout its description that the large particulate material and the small particulate material should be separate. Specifically, *Nguyen* defines the "particulate blend" by stating that the "particulate blend comprises a large particulate material and a small particulate material." (*Nguyen*, col. 7, ll. 32-34). When discussing the use of an additional hardenable resin, *Nguyen* states that "the resin system can be (a) added to the treating composition at the well site, (b) included as a precoating on the individual particles of the particulate blend, . . ." (*Id.*, col. 7, ll. 37-41). Thus, the hardenable resin can be coated on <u>individual</u> particles, which comprise both large and small particulates. In describing the hardenable resin, *Nguyen* states that "the hardenable resin system will be included in the treating composition in an effective amount for consolidating <u>the particulate blend</u> to form a hard permeable mass <u>within the subterranean zone being treated</u>." (*Id.*, col. 10, ll. 41-45 (emphasis added)). Thus, the particulates comprise a small particulate and a large particulate, even if coated with a hardenable resin, until they reach the subterranean zone being treated before they are consolidated. The further specific embodiments all describe the <u>particulate blend</u> as being consolidated within the zone of interest (*e.g.*, the subterranean formation (*Nguyen*, col. 10, ll. 41-45), the formation fractures (*id.*, col. 13, ll. 35-39), around a screening device (*id.*, col. 15, ll. 7-13)). Appellants note that *Nguyen* does not describe a "composite particle" or that the small particulate material and the large particulate material

ever adhere to one another prior to being placed in the specific zone of interest. Thus in contrast to the Examiner's assertion, *Nguyen* does describe that the large particulate material and the small particulate material are present separately from each other in the stream before being placed in the zone of interest, even in the presence of a hardenable resin.

Appellants note that the Examiner's arguments that the particles would adhere to one another does not contain a reference to a particular teaching in the cited prior art. It would appear that the Examiner is relying on inherency to argue that two resin coated particulates would adhere to form a coated particulate. However, simply having two resin coated particulates in a solution would not necessarily cause the two particulates to adhere—an interpretation that would further conflict with the express teachings of *Nguyen* for placing a <u>particulate blend</u>, rather than a composite particulate, into the formation. As stated by the Court of Appeals for the Federal Circuit "[t]o establish inherency, the extrinsic evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." (*In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999); *see also* MPEP § 2112). Thus, the fact that two resin coated particulates may adhere in a treatment fluid is insufficient to inherently disclose a reduced-density, coated particulate.

In contrast to the teaching of a particulate <u>blend</u> in *Nguyen*, *Beck* is directed to a composite proppant formed by mixing core particles with adhesive and coating the core

particles with hollow microparticles to adhere the microparticles to the coated core. (*Beck* at col. 2, l. 65 – col. 3, l. 7). These particles are cured to form a single sized particulate prior to being placed in a wellbore. (*Id.*). Thus, applying the teachings of *Beck* to the particulate blend of *Nguyen* would result in the adhesion of the relatively small particulates to the relatively large particulates prior to being placed in the wellbore. In other words, the combined particulates would have a single size, which is contrary to the purpose and functionality of the <u>particulate blend</u> of *Nguyen*. It should therefore be clear that in forming a rejection based on a combination of *Nguyen* in view of *Beck*, the proposed modification renders the particulate blend, which would become agglomerated, unsatisfactory for its intended purpose. Thus, there is no suggestion or motivation to make the proposed modification. *See* MPEP 2143.01(V).

In response to the Appellants' statements, the Examiner has indicated that "one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references." (Final Office Action at 5). Appellants specifically note that under MPEP §2143, Appellants are arguing against the ability to combine the references and not against the references individually. To the extent that *Nguyen* and *Beck* cannot be combined, the combination argued by the Examiner cannot be used to form a *prima facie* case of obviousness.

2. <u>Nguyen, Martin, and Beck Do Not Disclose "Allowing the Density Reducing Material to Adhere to a Surface of the Coated Particulate to Create at Least One Reduced-Density, Coated Particulate in the Third Flowing Stream" and Combining the Third Stream With a Carrier Fluid Prior to Being Placed in the Subterranean Formation</u>

Further, the combination of *Nguyen*, *Martin*, and *Beck* does not disclose all of the elements of independent claims 18, 35, or 68. Even if *Nguyen* could be modified by the

teachings of *Martin*—a position the Appellants do not adopt—the references would not disclose at least "allowing the density reducing material to adhere to a surface of the coated particulate to create at least one reduced-density, coated particulate in the third flowing stream" and combining the third stream with a carrier fluid prior to being placed in the subterranean formation as required by independent claims 18, 35, and 68. The Examiner argues that "according to Nguyen *et al.* the hardenable epoxy resin rapidly coats particulate materials such as sand, glass beads or synthetic resin pellets in a treating composition in the presence of <u>the gelled aqueous carrier liquid and a surface active agent</u> . . ." (Final Office Action at 5-6 (emphasis added)). Appellants note that even if two particulates coated with resin were to collide and adhere—a proposition that Appellants assert would not necessarily occur—the teachings of *Nguyen* indicated that they would do so in the gelled aqueous carrier liquid containing a surface active agent (*i.e.*, a servicing fluid). Thus, even if the Examiner's argument were to be accepted, *Nguyen* does not disclose the formation of "at least one reduced-density, coated particulate in the third flowing stream," which must occur prior to the third flowing stream being combined with a servicing fluid to form the fourth flowing stream.

Further, *Martin* does not describe coating a particulate at all. Specifically, *Martin*, is directed towards the use of at least first particles having a first density and second particles having a second density (*i.e.*, two separate particles), and thus does not describe a composite particle. (*See Martin* Abstract). Nor does *Martin* disclose a resin being used. As *Martin* does not disclose any type of composite, reduced density particulate, *Martin* cannot disclose "allowing the density reducing material to adhere to a surface of the coated particulate to create at least one reduced-density, coated particulate

in the third flowing stream" and combining the third stream with a carrier fluid prior to being placed in the subterranean formation as required by independent claims 18, 35, and 68.

Beck also does not describe combining a particulate with a servicing fluid. Thus, *Beck* cannot disclose "allowing the density reducing material to adhere to a surface of the coated particulate to create at least one reduced-density, coated particulate in the third flowing stream" and combining the third stream with a carrier fluid prior to being placed in the subterranean formation as required by independent claims 18, 35, and 68.

Thus, the combination of *Nguyen* in view of *Martin*, further in view of *Beck* fails to obviate claims 18, 35, and 68. Claims 19, 25, 28, 31-32, 36, 42, 45, 48-49, 65-66, 69-73, 75 and 77 depend, either directly or indirectly, from independent claims 18, 35, and 68 and therefore include all the limitations of independent claims 18, 35, and 68. Thus, claims 18-19, 25, 28, 31-32, 35-36, 42, 45, 48-49, 65-66, 68-73, 75, and 77 are patentable over the combination of *Nguyen*, *Martin*, and *Beck*. See 35 U.S.C. § 112 ¶ 4 (2004) Accordingly, for at least these reasons, Appellants respectfully request withdrawal of this rejection with respect to claims 18-19, 25, 28, 31-32, 35-36, 42, 45, 48-49, 65-66, 68-73, 75 and 77.

B. Rejection of Claims 18-19, 25, 28, 31-32, 35-36, 42, 45, 48-49, 65-66, 68-73, 75 and 77 under 35 U.S.C. § 103(a) over *Nguyen* in view of *Martin*, *Beck* and *Sielcken*

Claims 18-19, 25, 28, 31-32, 35-36, 42, 45, 48-49, 65-66, 68-73, 75 and 77 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Nguyen* in view of *Martin* and *Beck*, and further in view of U.S. Patent No. 5,585,524 to Sielcken *et al*. (hereinafter "*Sielcken*"). Appellants respectfully disagree.

As discussed above in Section VII.A., there is no suggestion or motivation to combine the teachings of *Nguyen* with the teachings of *Beck*. Further, the teachings of *Sielcken* do not make up for the deficiencies in the proposed combination. Specifically, the Examiner cites *Sielcken* for the alleged teaching of using a CSTR to carry out the continuous mixing process of *Nguyen*. *Sielcken* does not disclose at least "allowing the density reducing material to adhere to a surface of the coated particulate to create at least one reduced-density, coated particulate in the third flowing stream" and combining the third stream with a carrier fluid prior to being placed in the subterranean formation as required by independent claims 18, 35, and 68. Claims 19, 25, 28, 31-32, 36, 42, 45, 48-49, 65-66, 69-73, 75 and 77 depend, either directly or indirectly, from independent claims 18, 35, and 68 and therefore include all the limitations of independent claims 18, 35, and 68. Thus, claims 18-19, 25, 28, 31-32, 35-36, 42, 45, 48-49, 65-66, 68-73, 75 and 77 are patentable over the combination of *Nguyen*, *Martin*, *Beck*, and *Sielcken*. *See* 35 U.S.C. § 112 ¶ 4 (2004) Accordingly, for at least these reasons, Appellants respectfully request withdrawal of this rejection with respect to claims 18-19, 25, 28, 31-32, 35-36, 42, 45, 48-49, 65-66, 68-73, 75 and 77.

C. Rejection of Claims 18-19, 25-26, 28, 31-32, 35-36, 42-43, 45, 48-49, 65-66, 68-75 and 77 under 35 U.S.C. § 103(a) over *Murphey '390* in view of *Martin*, *Beck* and *Sielcken*

Claims 18-19, 25-26, 28, 31-32, 35-36, 42-43, 45, 48-49, 65-66, 68-75 and 77 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,128,390 to Murphey *et al*. (hereinafter "*Murphey '390*") in view of *Martin* and *Beck*, and further in view of *Sielcken*.

In order for a reference or combination of references to form the basis for a rejection under § 103(a), a *prima facie* case of obviousness must be established. The United States Supreme court has identified a number of rationales under which a *prima facie* case of obviousness may be established. *See KSR International Co. v. Teleflex, Inc.*, 550 U.S. 398, 127 S.Ct. 1727, 1731 (2007). Each rationale is directed towards identifying known elements in the prior art. *See* MPEP § 2143. Further, it is improper to combine references where the references themselves teach away from the combination. See MPEP § 2145 X.D. Appellants respectfully submit that the cited references teach away from their combination, and thus, the Examiner has not established a *prima facie* case of obviousness.

Specifically, the Examiner states that the combination used to reject the claims could be based on *Murphey '390*. *Murphey '390* would then be modified to include the particle blend of *Martin* and then the particle blend would be combined to form a single composite particulate using the teachings of *Beck*. In essence, the Examiner has identified individual elements in the prior art and cobbled them together to form the present rejection. However, the references used by the Examiner teach away from their combination.

Even if *Murphey '390* and *Martin* could be combined, the teachings of *Martin* contradict those of *Beck*. With respect to *Martin*, the invention is directed towards the use of at least first particles having a first density and second particles having a second density (*i.e.*, two separate particles). (*See Martin* Abstract). The particles can be injected as a <u>blend</u> or as <u>sequential slugs</u>. (*Id.*, (emphasis added)). The two different densities are preferably chosen so that the "first density [is] less than the density of the carrier liquid

and . . . [the] second density [] is greater than the density of the carrier liquid." (*Martin* at col. 2, ll. 18-20). In this manner, the upper perforations are packed predominantly by the less dense particles while the lower perforations are predominantly packed by the more dense particles. In other words, the less dense particles predominantly float to pack the top perforations while the more dense particles predominantly sink to pack the lower perforations. *Martin* thus relies on the density differences between the particles to improve the packing efficiency in the perforations relative to using a single density particle such as sand. (*See Id*. at col. 4, ll. 9-14). Thus, the principle of operation of *Martin* clearly relies upon the inclusion of a <u>blend</u> of at least two separate particles or <u>sequential slugs</u> of two separate particles with distinct differences in density relative to the carrier fluid. The particles of *Martin* would not function the same if only a single sized particle with a single density were used.

The Examiner argues that "Martin on the other hand teaches that proppant particles should have a density closely matching the density of carrier fluids to avoid settling problem by combining stream containing dense particles such as sand with stream containing low density particles such as SVDB. Although Martin et al. does not explicitly teach that sand/SVDB particulate material that closely matches density of carrier liquids is composite particle having dense core particles coated with low density particles, one of ordinary skill in the art would easily recognize that the dense sand particles and the SVDB particles have to form composite particles in order to achieve the desired 'middle' density matching density of the carrier liquid." (Final Office Action at 6-7). Appellants note that this appears to be a mischaracterization of *Martin*. *Martin* is actually directed to solving the problem presented by "the use of particulate materials and carrier

liquids with more closely matched density . . . ." (*Martin*, col. 1, ll. 63-68). *Martin* specifically mentions that "the cost of these specialized materials greatly exceeds the cost of simple sand packing materials." (*Martin*, col. 2, ll. 6-8). This is the reason that *Martin* is directed towards a mixture of individual particles with two distinct densities and not a single, composite particle. At no point does *Martin* mention the formation of a composite particle, the use of any type of binder to form a composite particle, or the need for a particle of a "middle" density. Such a characterization ignores the states purpose of *Martin*. Thus, *Martin* is directed towards the use of at least two separate particles, and not any type of composite particle.

As noted above in Section VII.A, *Beck* is directed to composite proppant formed by mixing core particles with adhesive and coating the core particles with hollow microparticles to adhere the microparticles to the coated core. (*Beck* at col. 2, l. 65 – col. 3, l. 7). These particles are cured to form a single sized particulate with a density approaching the density of the carrier fluid. (*Id*.). Thus, applying the teachings of *Beck* to the particle blend or sequential slugs of *Murphey '390* in view of *Martin* would result in the formation of a single composite particle with a single density prior to being placed in the wellbore. In other words, the combined particles would have a single size and a single density, which is contrary to the purpose and functionality of the invention of *Martin*. It should therefore be clear that the individual references teach away from the combination of the references as presented by the Examiner.

Appellants note that *Sielcken* does not provide any teachings for or against the combination of *Murphey '390*, *Martin*, and *Beck* as *Sielcken* is directed towards a method for the preparation of an aldehyde and does not discuss particulates or hydrocarbon

production. Specifically, the Examiner cites *Sielcken* for the alleged teaching of using a CSTR to carry out the continuous mixing process. (Final Office Action at 12-13).

Therefore, Appellants respectfully assert that independent claims 18, 35, and 68 and their dependent claims are not rendered obvious by the combination of *Murphey '390*, *Martin*, *Beck*, and *Sielcken*. Accordingly, Appellants respectfully request withdrawal of this rejection with respect to claims 18-19, 25-26, 28, 31-32, 35-36, 42-43, 45, 48-49, 65-66, 68-75, and 77.

D. Rejection of Claims 26, 43 and 74 under 35. U.S.C. § 103(a) over *Nguyen* in view of *Martin*, *Beck*, *Sielcken*, Murphey '390 and *Murphey '988*

Claims 26, 43 and 74 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Nguyen* in view of *Martin* and *Beck*, or over *Nguyen* in view of *Martin* and *Beck*, further in view of *Sielcken* or over *Murphey '390* in view of *Martin* and *Beck*, further in view of *Sielcken*, and further in view of U.S. Patent No. 4,665,988 to Murphey *et al*. (hereinafter "*Murphey '988*").

As discussed above, there is no suggestion or motivation to combine the teachings of *Nguyen* with the teachings of *Beck*. Also as discussed above, the references teach away from the combination of *Murphey '390*, *Martin*, and *Beck*, with or without *Sielcken*. The teachings of *Murphey '988* do not make up for the deficiencies in the proposed combination. Specifically, the Examiner cites *Murphey '988* for the alleged teaching of ethylene glycol butyl ether as a solvent for dissolving epoxy resins. (Final Office Action at 13). *Murphey '988* does not provide a suggestion or motivation to combine the teachings of *Nguyen* and *Beck*. Similarly, *Murphey '988* does not counteract the disparate teachings of *Murphey '390*, *Martin*, and *Beck*, with or without *Sielcken* that teach away

from a combination of the references. Thus, *Murphey '988* does not make up for the deficiencies with either of these combinations.

The combinations of *Nguyen* in view of *Martin* and *Beck*, and/or in further view of *Sielcken*, or *Murphey '390* in view of *Martin*, *Beck*, *Sielcken*, and *Murphey '988* cannot obviate claims 26, 43, and 74. Accordingly, for at least these reasons, Appellants respectfully request withdrawal of this rejection with respect to claims 26, 43 and 74.

E. Rejection of Claims 28-29, 45-46 and 75-76 under 35 U.S.C. § 103(a) over Nguyen in view of Martin and Beck or over Nguyen in view of Martin and Beck, further in view of Sielcken or over Murphey '390, in view of Martin and Beck, further in view of Sielcken, and further in view of McDaniel

Claims 28-29, 45-46 and 75-76 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Nguyen* in view of *Martin* and *Beck* or over *Nguyen* in view of *Martin* and *Beck*, further in view of *Sielcken* or over *Murphey '390*, in view of *Martin* and *Beck*, further in view of *Sielcken*, and further in view of U.S. Patent Application No. 2002/0048676 to McDaniel *et al*. (hereinafter "*McDaniel*").

As discussed above, there is no suggestion or motivation to combine the teachings of *Nguyen* with the teachings of *Beck* and the references teach away from the combination of *Murphey '390*, *Martin*, and *Beck*, with or without *Sielcken*. Moreover, the teachings of *McDaniel* do not make up for the deficiencies in the proposed combination. Specifically, the Examiner cites *McDaniel* for the alleged teaching of a functional equivalency among resins. (Final Office Action at 14). *McDaniel* does not provide a suggestion or motivation to combine the teachings of *Nguyen* and *Beck*. Similarly, *McDaniel* does not counteract the disparate teachings of *Murphey '390*, *Martin*, and *Beck*,

with or without *Sielcken* that teach away from a combination of the references. Thus, *McDaniel* does not make up for the deficiencies with either of these combinations.

The combinations of *Nguyen* in view of *Martin* and *Beck*, and/or in further view of *Sielcken*, or *Murphey '390* in view of *Martin*, *Beck*, *Sielcken*, and *McDaniel* cannot obviate claims 26, 43, and 74. Accordingly, for at least these reasons, Appellants respectfully request withdrawal of this rejection with respect to claims 28-29, 45-46 and 75-76.

VIII. CONCLUSION

In light of the foregoing, Appellants respectfully request that the final rejection of the pending claims should be reversed and the application be remanded for allowance of the pending claims, or, alternatively, remand the application for further examination if appropriate references can be found by the Examiner.

The Commissioner has been authorized to debit McDermott Will & Emery's Deposit Account No. 500417 (Reference No. 086108.0157), in the amount of $540 under 37 C.F.R. § 41.20(b)(2) for filing an appeal brief and in the amount of $130 under 37 CFR 1.136(a) for a one month extension of time. Should the Commissioner deem that any additional fees are due; the Commissioner is authorized to debit McDermott Will & Emery's Deposit Account No. 500417 (Reference No. 086108.0157).

Respectfully submitted,

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APPENDIX A: CLAIMS INVOLVED IN THE APPEAL

Claims:

1. - 17. (Cancelled)

18. (Previously Presented) A method of treating a subterranean formation comprising:

providing a first flowing stream comprising at least one coated particulate, wherein the coated particulate comprises a particulate coated with a coating material and wherein the particulate has a size in the range of from 4 to 100 U.S. mesh;

providing a second flowing stream comprising at least one density reducing material comprising polystyrene divinylbenzene, wherein the density reducing material is a solid material with a size that is greater than about half the size of the coated particulate and has a specific gravity less than the coated particulate;

combining the first flowing stream and the second flowing stream to form a third flowing stream that comprises the first flowing stream, and the second flowing stream, wherein the first flowing stream and the second flowing stream are combined and mixed while continuing to flow as a stream;

allowing the density reducing material to adhere to a surface of the coated particulate to create at least one reduced-density, coated particulate in the third flowing stream;

combining the reduced-density, coated particulate with a servicing fluid to form a fourth flowing stream; and

placing the fourth flowing stream into the subterranean formation.

19. (Previously Presented) The method of claim 18 wherein the coating material comprises at least one resin composition.

20. (Withdrawn) The method of claim 19 wherein the resin composition comprises at least one hardenable resin component comprising at least one hardenable resin and at least one hardening agent component comprising at least one liquid hardening agent, at least one silane coupling agent, and at least one surfactant.

21. (Withdrawn) The method of claim 19 wherein the resin composition comprises at least one furan-based resin selected from the group consisting of a furfuryl alcohol, a mixture furfuryl alcohol with an aldehyde, a mixture of furan resin and phenolic resin and any combination thereof.

22. (Withdrawn) The method of claim 21 further comprising at least one solvent selected from the group consisting of 2-butoxy ethanol, butyl acetate, furfuryl acetate, and any combination thereof.

23. (Withdrawn) The method of claim 19 wherein the resin composition comprises at least one phenolic-based resin selected from the group consisting of a terpolymer of phenol, a phenolic formaldehyde resin, a mixture of phenolic and furan resin, and any combination thereof.

24. (Withdrawn) The method of claim 23 wherein the resin composition further comprises at least one solvent selected from the group consisting of butyl acetate, butyl lactate, furfuryl acetate, 2-butoxy ethanol, and any combination thereof.

25. (Previously Presented) The method of claim 19 wherein the resin composition comprises at least one high-temperature epoxy-based resin selected from the group consisting of bisphenol A-epichlorohydrin resin, polyepoxide resin, novolac resin, polyester resin, glycidyl ethers, and any combination thereof.

26. (Previously Presented) The method of claim 25 wherein the resin composition further comprises at least one solvent selected from the group consisting of

dimethyl sulfoxide, dimethyl formamide, dipropylene glycol methyl ether, dipropylene glycol dimethyl ether, dimethyl formamide, diethylene glycol methyl ether, ethylene glycol butyl ether, diethylene glycol butyl ether, propylene carbonate, d-limonene, fatty acid methyl esters, and any combination thereof.

27. (Withdrawn) The method of claim 19 wherein the resin composition comprises at least one phenol/phenol formaldehyde/furfuryl alcohol resin comprising from about 5% to about 30% phenol, from about 40% to about 70% phenol formaldehyde, from about 10 to about 40% furfuryl alcohol, from about 0.1% to about 3% of a silane coupling agent, and from about 1% to about 15% of a surfactant.

28. (Previously Presented) The method of claim 18 wherein the coating material comprises at least one tackifying composition.

29. (Previously Presented) The method of claim 28 wherein the tackifying composition comprises at least one tackifying composition selected from the group consisting of a polyamide, a polyester, a polycarbonate, a polycarbamate, a natural resin, and any combination thereof.

30. (Cancelled)

31. (Original) The method of claim 18 wherein the density-reducing material comprises low-density material similar in size to the particulate material.

32. (Original) The method of claim 18 wherein the particulate material is coated with the coating material on-the-fly.

33. (Cancelled)

34. (Cancelled)

35. (Previously Presented) A method of fracturing a subterranean formation comprising:

providing a first flowing stream comprising at least one coated particulate, wherein the coated particulate comprises a particulate coated with a coating material and wherein the particulate has a size in the range of from 4 to 100 U.S. mesh;

providing a second flowing stream comprising at least one density reducing material, wherein the density reducing material is a solid material with a size that is greater than about half the size of the coated particulate and has a specific gravity less than the coated particulate;

combining the first flowing stream and the second flowing stream to form a third flowing stream that comprises the first flowing stream, and the second flowing stream, wherein the first flowing stream and the second flowing stream are combined and mixed while continuing to flow as a stream;

allowing the density reducing material to adhere to a surface of the coated particulate to create at least one reduced-density, coated particulate in the third flowing stream;

combining the reduced-density, coated particulate with a fracturing fluid to form a fourth flowing stream; and

placing the fourth flowing stream into the subterranean formation at a pressure sufficient to create at least one fracture therein.

36. (Previously Presented) The method of claim 35 wherein the coating material comprises at least one resin composition.

37. (Withdrawn) The method of claim 36 wherein the resin composition comprises at least one hardenable resin component comprising at least one hardenable resin and at least one hardening agent component comprising at least one liquid hardening agent, at least one silane coupling agent, and at least one surfactant.

38. (Withdrawn) The method of claim 36 wherein the resin composition comprises at least one furan-based resin selected from the group consisting of a furfuryl alcohol, a mixture furfuryl alcohol with an aldehyde, a mixture of furan resin and phenolic resin and any combination thereof.

39. (Withdrawn) The method of claim 38 wherein the resin composition further comprises at least one solvent selected from the group consisting of 2-butoxy ethanol, butyl acetate, furfuryl acetate, and any combination thereof.

40. (Withdrawn) The method of claim 36 wherein the resin composition comprises at least one phenolic-based resin selected from the group consisting of a terpolymer of phenol, a phenolic formaldehyde resin, a mixture of phenolic and furan resin, and any combination thereof.

41. (Withdrawn) The method of claim 40 wherein the resin composition further comprises at least one solvent selected from the group consisting of 2-butoxy ethanol, butyl acetate, furfuryl acetate, and any combination thereof.

42. (Previously Presented) The method of claim 36 wherein the resin composition comprises at least one high-temperature epoxy-based resin selected from the group consisting of bisphenol A-epichlorohydrin resin, polyepoxide resin, novolac resin, polyester resin, glycidyl ethers, and any combination thereof.

43. (Previously Presented) The method of claim 42 wherein the resin composition further comprises at least one solvent selected from the group consisting of dimethyl sulfoxide, dimethyl formamide, dipropylene glycol methyl ether, dipropylene glycol dimethyl ether, dimethyl formamide, diethylene glycol methyl ether, ethylene glycol butyl ether, diethylene glycol butyl ether, propylene carbonate, d-limonene, fatty acid methyl esters, and any combination thereof.

44. (Withdrawn) The method of claim 36 wherein the resin composition comprises at least one phenol/phenol formaldehyde/furfuryl alcohol resin comprising from about 5% to about 30% phenol, from about 40% to about 70% phenol formaldehyde, from about 10 to about 40% furfuryl alcohol, from about 0.1% to about 3% of a silane coupling agent, and from about 1% to about 15% of a surfactant.

45. (Previously Presented) The method of claim 35 wherein the coating material comprises at least one tackifying composition.

46. (Previously Presented) The method of claim 45 wherein the tackifying composition comprises at least one tackifying composition selected from the group consisting of a polyamide, a polyester, a polycarbonate, a polycarbamate, a natural resin, and any combination thereof.

47. (Cancelled)

48. (Previously Presented) The method of claim 35 wherein the density-reducing material comprises low-density material similar in size to the particulate material.

49. (Previously Presented) The method of claim 35 wherein the particulate material is coated with the coating material on-the-fly.

50. (Withdrawn) A method of installing a gravel pack comprising:

providing a first flowing stream comprising at least one coated particulate, wherein the coated particulate comprises a particulate coated with a coating material and wherein the particulate has a size in the range of from 4 to 100 U.S. mesh;

providing a second flowing stream comprising at least one density reducing material, wherein the density reducing material is a solid material with a size that is

greater than about half the size of the coated particulate and has a specific gravity less than the coated particulate;

combining the first flowing stream and the second flowing stream to form a third flowing stream that comprises the first flowing stream, the second flowing stream, and a delivery fluid, wherein the first flowing stream and the second flowing stream are combined and mixed while continuing to flow as a stream;

allowing the density reducing material to adhere to a surface of the coated particulate to create at least one reduced-density, coated particulate in the third flowing stream; and

introducing the third flowing stream into the well bore so that the at least one reduced-density, coated gravel particulate forms a gravel pack substantially adjacent to the wellbore.

51. (Withdrawn) The method of claim 50 wherein the coating material comprises at least one resin composition.

52. (Withdrawn) The method of claim 51 wherein the resin composition comprises at least one hardenable resin component comprising at least one hardenable resin and at least one hardening agent component comprising at least one liquid hardening agent, at least one silane coupling agent, and at least one surfactant.

53. (Withdrawn) The method of claim 51 wherein the resin composition comprises at least one furan-based resin selected from the group consisting of a furfuryl alcohol, a mixture furfuryl alcohol with an aldehyde, a mixture of furan resin and phenolic resin and any combination thereof.

54. (Withdrawn) The method of claim 53 further comprising at least one solvent selected from the group consisting of 2-butoxy ethanol, butyl acetate, furfuryl acetate, and any combination thereof.

55. (Withdrawn) The method of claim 51 wherein the resin composition comprises at least one phenolic-based resin selected from the group consisting of a terpolymer of phenol, a phenolic formaldehyde resin, a mixture of phenolic and furan resin, and any combination thereof.

56. (Withdrawn) The method of claim 55 wherein the resin composition further comprises at least one solvent selected from the group consisting of butyl acetate, butyl lactate, furfuryl acetate, 2-butoxy ethanol, and any combination thereof.

57. (Withdrawn) The method of claim 51 wherein the resin composition comprises at least one high-temperature epoxy-based resin selected from the group consisting of bisphenol A ¬epichlorohydrin resin, polyepoxide resin, novolac resin, polyester resin, glycidyl ethers, and any combination thereof.

58. (Withdrawn) The method of claim 57 wherein the resin composition further comprises at least one solvent selected from the group consisting of dimethyl sulfoxide, dimethyl formamide, dipropylene glycol methyl ether, dipropylene glycol dimethyl ether, dimethyl formamide, diethylene glycol methyl ether, ethylene glycol butyl ether, diethylene glycol butyl ether, propylene carbonate, d'limonene, fatty acid methyl esters, and any combination thereof.

59. (Withdrawn) The method of claim 51 wherein the resin composition comprises at least one phenol/phenol formaldehyde/furfuryl alcohol resin comprising from about 5% to about 30% phenol, from about 40% to about 70% phenol

formaldehyde, from about 10 to about 40% furfuryl alcohol, from about 0.1% to about 3% of a silane coupling agent, and from about 1% to about 15% of a surfactant.

60. (Withdrawn) The method of claim 50 wherein the coating material comprises at least one tackifying composition.

61. (Withdrawn) The method of claim 60 wherein the tackifying composition comprises at least one tackifying composition selected from the group consisting of a polyamide, a polyester, a polycarbonate, a polycarbamate, a natural resin, and any combination thereof.

62. (Cancelled)

63. (Withdrawn) The method of claim 50 wherein the density-reducing material comprises low-density material similar in size to the particulate material.

64. (Withdrawn) The method of claim 50 wherein the particulate material is coated with the coating material on-the-fly.

65. (Previously Presented) The method of claim 18 wherein the servicing fluid is a fracturing fluid.

66. (Previously Presented) The method of claim 18 wherein placing the third flowing stream into the subterranean formation comprises placing the third flowing fluid into the subterranean formation at a pressure sufficient to create at least one fracture therein.

67. (Withdrawn) The method of claim 18 wherein placing the third flowing stream into the subterranean formation comprises introducing the third flowing stream into the well bore so that the at least one reduced-density, coated particulate forms a gravel pack substantially adjacent to the wellbore.

68. (Previously Presented) A method of treating a subterranean formation comprising:

providing a first flowing stream comprising at least one coated particulate, wherein the coated particulate comprises a particulate coated with a coating material and wherein the particulate has a size in the range of from 4 to 100 U.S. mesh;

providing a second flowing stream comprising at least one density reducing material, wherein the density reducing material is a solid material with a size that is greater than about half the size of the coated particulate and has a specific gravity less than the coated particulate;

combining the first flowing stream and the second flowing stream to form a third flowing stream that comprises the first flowing stream, and the second flowing stream, wherein the first flowing stream and the second flowing stream are combined and mixed while continuing to flow as a stream;

allowing the density reducing material to adhere to a surface of the coated particulate to create at least one reduced-density, coated particulate in the third flowing stream;

combining the reduced-density, coated particulate with a servicing fluid to form a fourth flowing stream; and

placing the fourth flowing stream into the subterranean formation.

69. (Previously Presented) The method of claim 68 wherein the servicing fluid is a fracturing fluid.

70. (Previously Presented) The method of claim 68 wherein placing the third flowing stream into the subterranean formation comprises placing the third flowing

stream into the subterranean formation at a pressure sufficient to create at least one fracture therein.

71. (Previously Presented) The method of claim 68 wherein the density reducing material comprises polystyrene divinylbenzene.

72. (Previously Presented) The method of claim 68 wherein the coating material comprises at least one resin composition.

73. (Previously Presented) The method of claim 68 wherein the resin composition comprises at least one high-temperature epoxy-based resin selected from the group consisting of bisphenol A-epichlorohydrin resin, polyepoxide resin, novolac resin, polyester resin, glycidyl ethers, and any combination thereof.

74. (Previously Presented) The method of claim 68 wherein the resin composition further comprises at least one solvent selected from the group consisting of dimethyl sulfoxide, dimethyl formamide, dipropylene glycol methyl ether, dipropylene glycol dimethyl ether, dimethyl formamide, diethylene glycol methyl ether, ethylene glycol butyl ether, diethylene glycol butyl ether, propylene carbonate, d-limonene, fatty acid methyl esters, and any combination thereof.

75. (Previously Presented) The method of claim 68 wherein the coating material comprises at least one tackifying composition.

76. (Previously Presented) The method of claim 75 wherein the tackifying composition comprises at least one tackifying composition selected from the group consisting of a polyamide, a polyester, a polycarbonate, a polycarbamate, a natural resin, and any combination thereof.

77. (Previously Presented) The method of claim 35 wherein the density reducing material comprises polystyrene divinylbenzene.

APPENDIX B: EVIDENCE APPENDIX

None

APPENDIX C: RELATED PROCEEDINGS APPENDIX

None